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DISTINCT EFFECTS OF ADJUVANTS IN THE MAGNITUDE AND QUALITY OF T CELL MEDIATED IMMUNE RESPONSES AGAINST MAP SUBUNIT PROTEINS BY VACCINATION

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Mycobacterium avium subsp. paratuberculosis (MAP) causes systemic infection and chronic intestinal inflammation in many animal species. The attenuated or killed whole-cell vaccines available against MAP are unable to completely prevent infection and shedding of bacteria. A novel vaccine strategy is protein subunit vaccines, which require the use of immunostimulatory adjuvants. Using a purified latent-stage MAP protein, MAP3694c, and a fusion-protein of four acute-stage MAP proteins, we evaluated the magnitude as well as quality of CD4+ T cell responses by different adjuvant formulations in calves. We observed that a water-in-oil emulsion (Montanide ISA61 VG) induced stronger effector T cell responses as compared to cationic-liposome adjuvant emulsions, CAF01 (DDA/TDB) and CAF09 (DDA/MMG/Poly IC). The stronger immune responses to MAP vaccine proteins induced by Montanide ISA61 VG were, however, accompanied by a cross-reaction towards purified protein derivative of Johnin protein. We also demonstrate that in terms of T cell quality, CAF09 adjuvant induces high quality of IFN-γ, TNF-α and IL-2 producing CD4+ multifunctional T cells compared to Montanide ISA61 VG. These results strengthen the evidence of tailored subunit vaccine immunogenicity using different adjuvant preparations. Our results highlight the need of measuring the magnitude as well the quality of immune responses in those infectious disease settings characterized by monitoring of low level immune responses as the latent MAP infection and after immunization with protein subunit vaccines.